

MEMORANDUM

TO: Docket Control

FROM: Elijah O. Abinah
Director
Utilities Division



DATE: May 17, 2021

RE: IN THE MATTER OF THE ROLE OF RENEWABLE NATURAL GAS IN
ARIZONA (DOCKET NO. G-00000A-21-0045).

SUBJECT: WORKSHOP PRESENTATIONS

A Stakeholder Meeting and Workshop regarding Renewable Natural Gas has been scheduled for May 18, 2021. Attached are the presentations that will be discussed during this workshop.

EOA:RSP:yw/

Originator: Ranelle Paladino

Attachments



Renewable Natural Gas Workshop Background

Bob Gray

Public Utilities Manager - Gas



Southwest Gas Rate Case

- Southwest Gas proposed incorporating renewable natural gas purchases into its overall gas supply portfolio
- Staff recommended denial of the proposed renewable natural gas program due to cost concerns
- Decision Number 77850 (December 17, 2020) found that “there are too many unknown variables associated with RNG to support the adoption of the proposed RNG program at this time. We note that the proposed RNG program involves a high-risk, speculative activity, and we do not believe it would be appropriate to pass the associated risks and costs on to ratepayers.”



Southwest Gas Rate Case cont.

- Decision Number 77850 (December 17, 2020) also ordered that “prior to June 1, 2021, Staff shall open a generic docket and hold not less than one workshop to explore the role of renewable natural gas in Arizona. The docket shall be open to all interested stakeholders and shall explore the role of renewable natural gas in the context of both regulated gas and electric service providers. The docket shall also explore the roles and definitions of different kinds and sources of renewable natural gases to determine which gases and 2 sources the Commission should consider renewable.
- Docket G-00000A-21-0045 was opened on March 20, 2021, to explore the role of renewable natural gas in Arizona



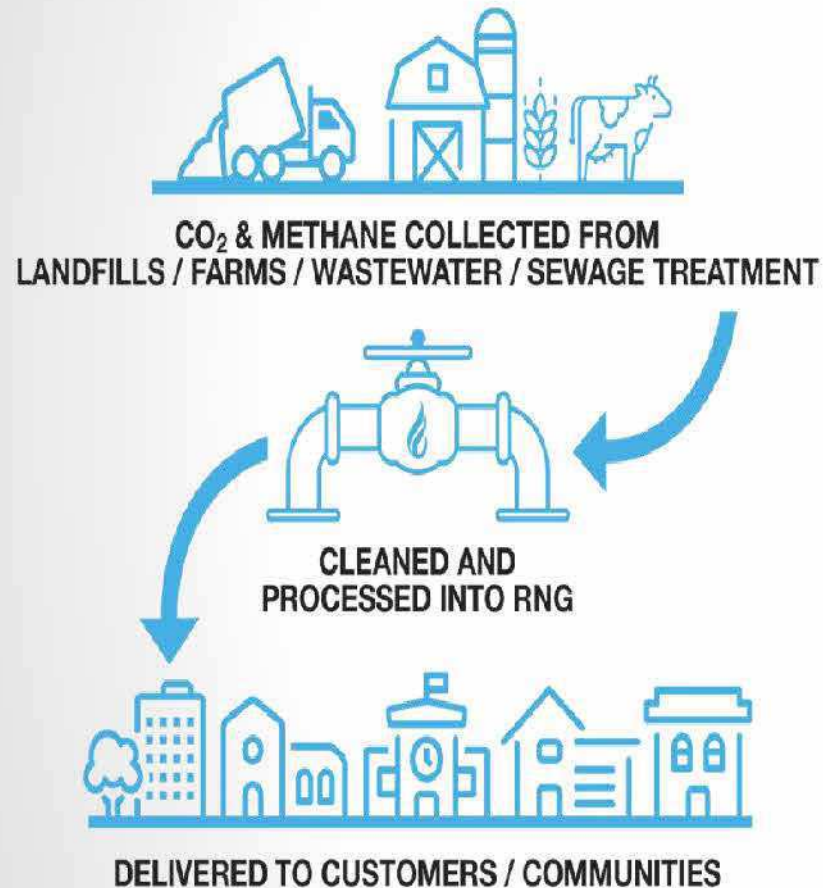
Arizona Corporation Commission RNG Workshop

May 18, 2021

Arizona RNG Projects and Customer Overview

Joe Varela - Director/Energy Solutions

Why Renewable Natural Gas?



- Reduce Fugitive Methane Emissions
- Reduce Customers GHG Emissions
- Sustainability
- Decarbonization

Schedule No. G-65



Gathering



Cleaning



Interconnection



Interstate
Pipeline

Southwest Gas
Pipeline

G-65 Agreements Approved by ACC

- Sunoma (Dairy)
- Pima County (WWTP)
- Maricopa (Dairy)
- Butterfield (Dairy)

Representative G-65 Project Costs

Item	Approximate \$
Interstate Pipeline Tap	\$1.6M
Pipe (SWG Distribution)	varies, approx. \$1M/mile
Interconnection	\$900k-\$1.2M
Metering	\$100k



RNG Purchasing Authority

John Olenick - Director/Gas Supply

Future RNG Role in Arizona

- Decarbonization
 - Displace conventional gas supplies with RNG
 - Reduce customers' GHG emissions
 - Integrate RNG into supply portfolio
 - Potential opt-in programs



RNG = Two Commodities

Brown Gas

Physical methane molecules

No different than conventional natural gas

Green Gas

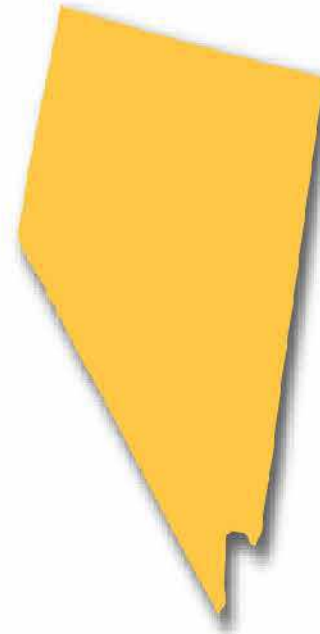
Environmental attributes = right to claim emission reduction

Economically valuable side of RNG

RNG Purchasing Framework

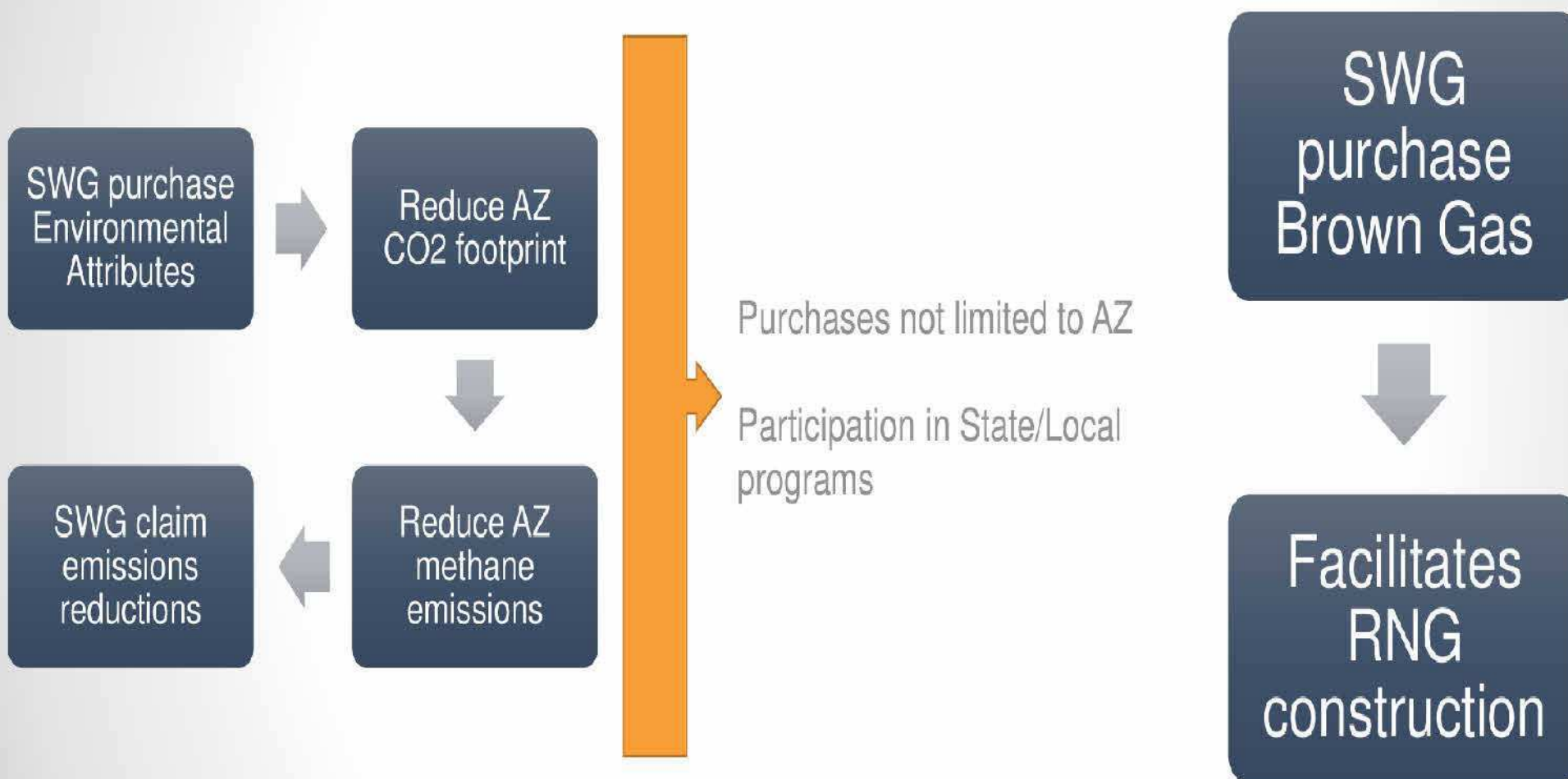


- ▶ Joint RNG Interconnection Agreement
- ▶ Gas Cost Incentive Mechanism
- ▶ RNG Purchases



- ▶ Schedule No. SG-RNG/NG-RNG
- ▶ SB 154
- ▶ Purchasing RNG for Regional Transportation Commission
- ▶ Incorporating RNG into gas supply portfolio

Potential Arizona RNG Purchase Framework



Thank you

Gas Utilities and Opportunities for Renewable Natural Gas

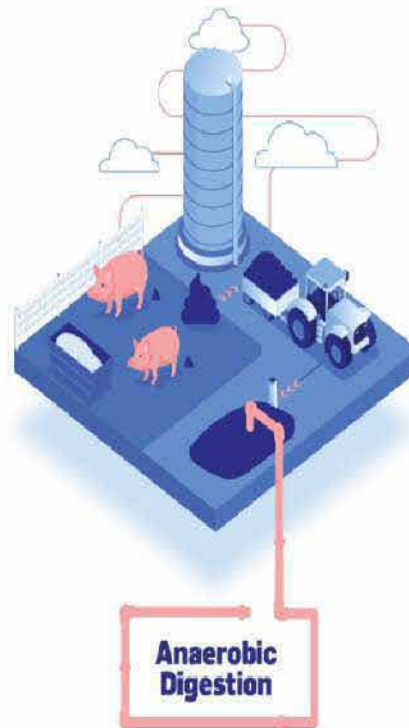
Emily O'Connell, Director Energy Markets Policy

American Gas Association

May 18, 2021

Renewable Natural Gas Production Technologies

Renewable Natural Gas (RNG) is pipeline compatible gaseous fuel derived from biogenic or other renewable sources that has lower lifecycle CO₂ emissions than geologic natural gas.



The most common way to produce RNG today, organic material such as animal or plant waste is broken down by microorganisms creating methane.



Low moisture biomass such as forestry waste or crop residue is converted into RNG through a high-pressure chemical process.



Renewable electricity is used to split water into hydrogen and oxygen through a process called electrolysis. This renewable hydrogen can be blended into the pipeline or combined with CO₂ to create RNG.

Renewable Sources of Natural Gas: Supply & Emission Reduction Assessment Study

Study Objective: To contribute a fact-based analysis that informs ongoing policy discussions around renewable natural gas and provide current data including estimates on:

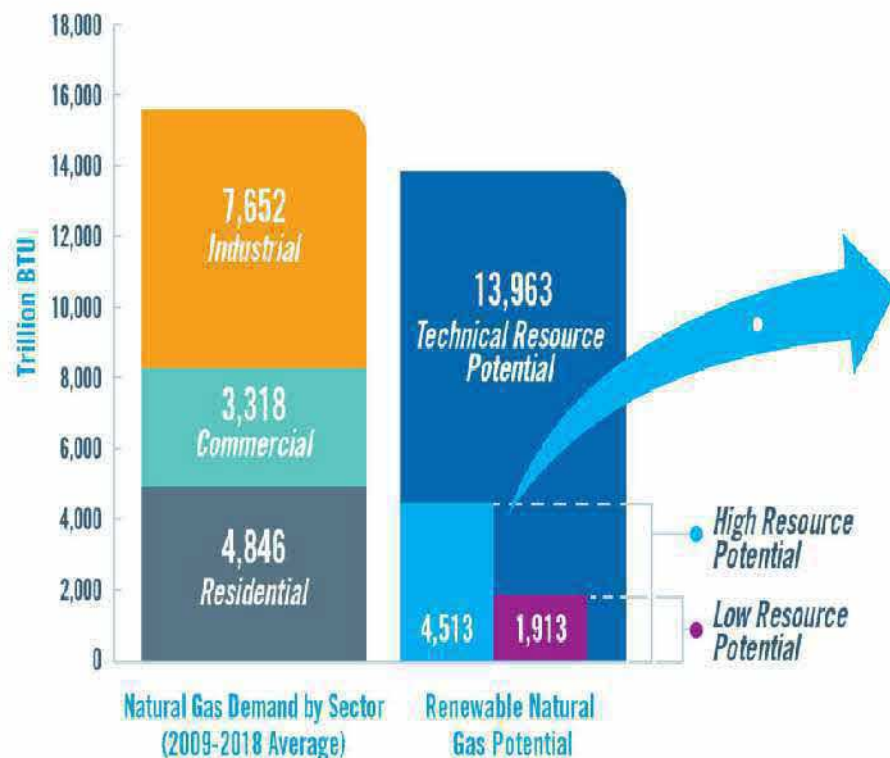
- The supply potential of domestic RNG resources
- RNG greenhouse gas emission reduction potential
- RNG costs

RNG Study Executive Summary

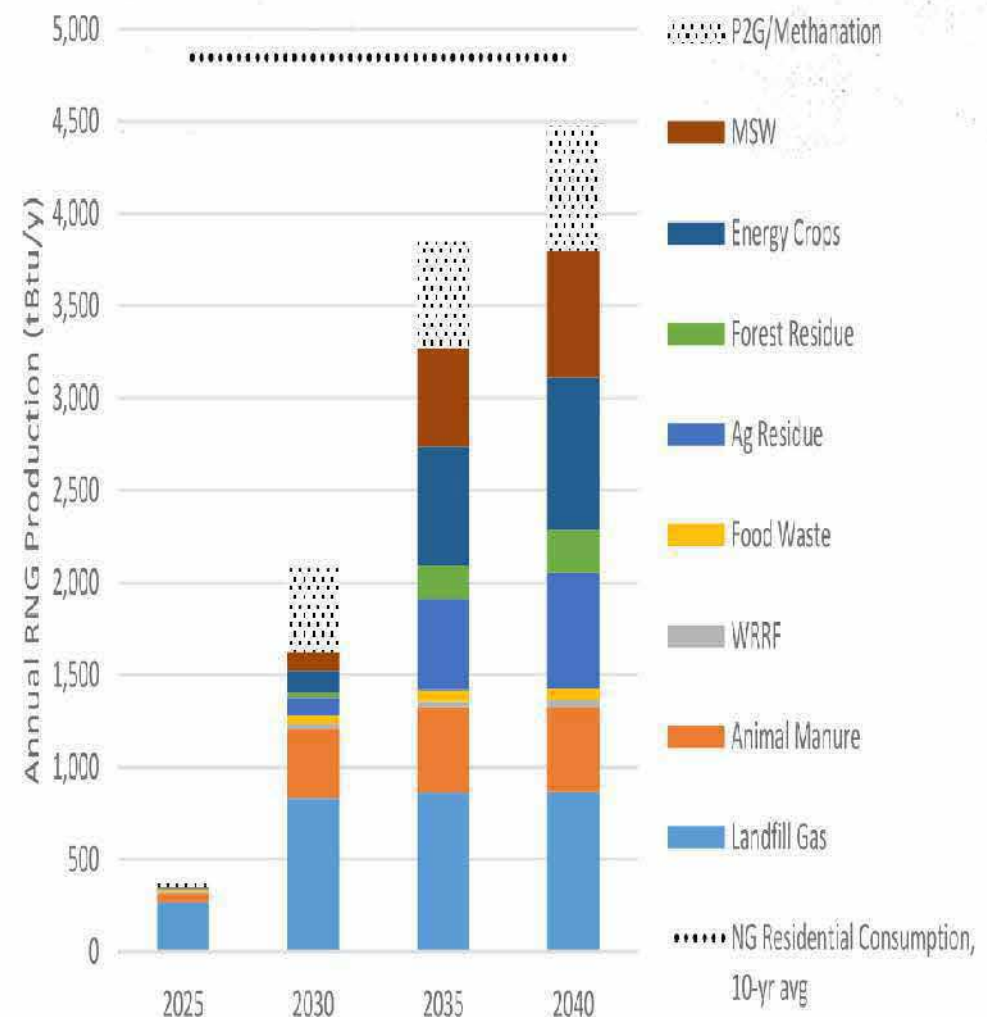
Key Findings

- Potential to Offset Residential Demand with RNG
- Represents up to a **95% reduction** in residential GHG emissions from natural gas
- RNG Costs are Competitive with Other Emission Reduction Strategies, \$55-300/ton of GHG Emission Reductions

RNG Resource Potential



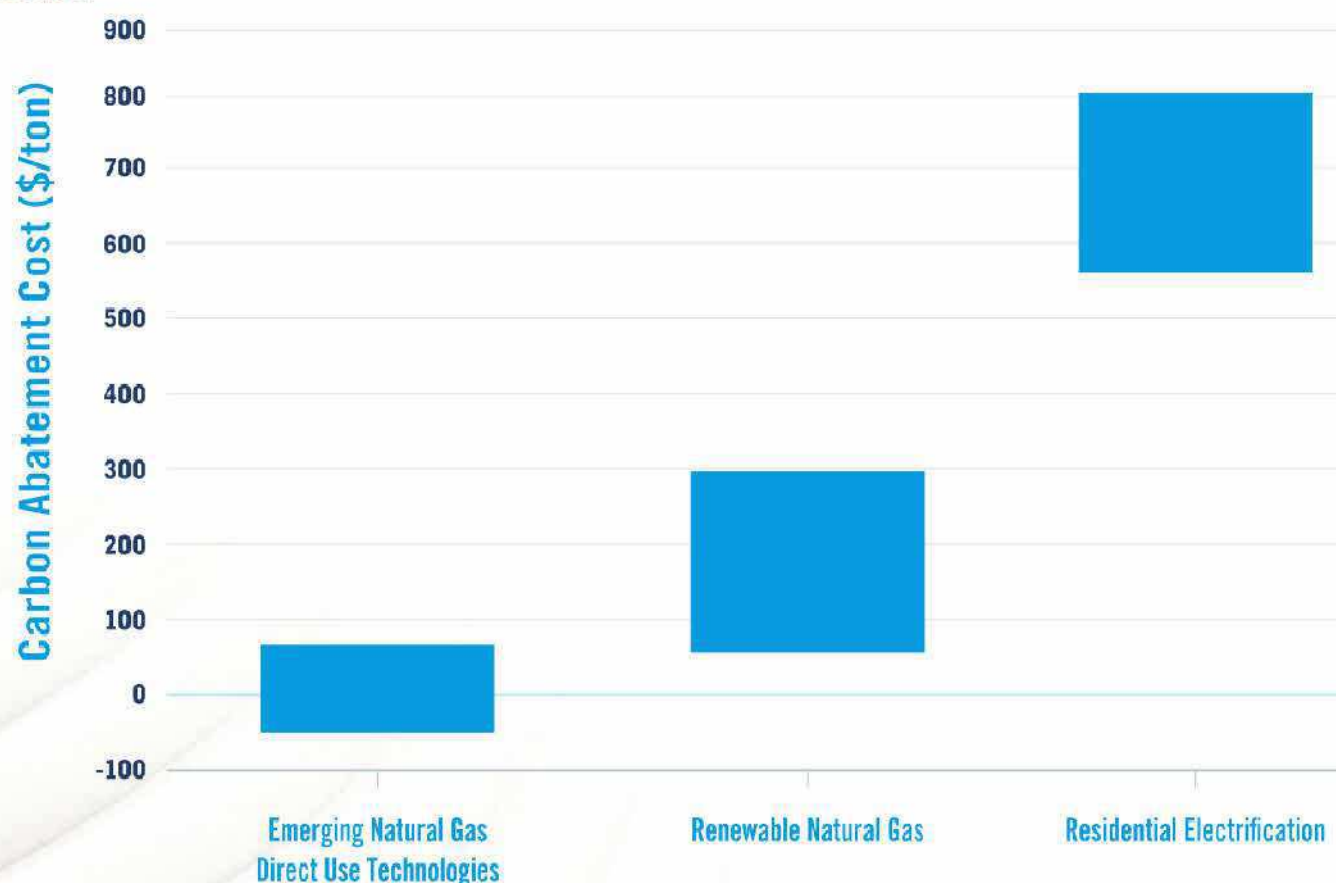
Estimated Annual Production



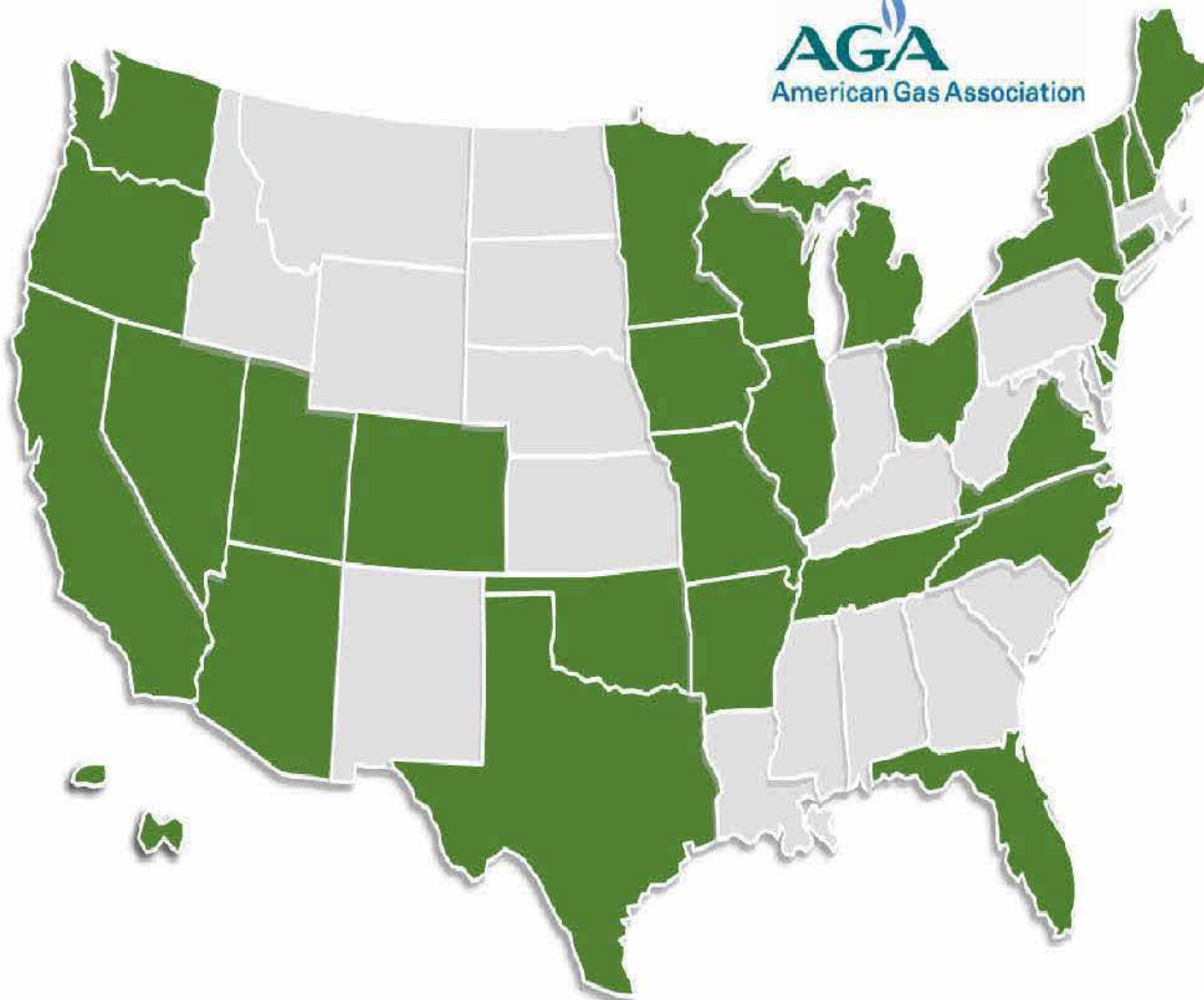
RNG IS A COST-EFFECTIVE WAY TO Reduce Emissions

RNG is a sustainable emission reduction strategy that is cost competitive with other emission reducing technologies.

Cost Comparison of GHG Reduction Pathways



Renewable Natural Gas State Activity



47 Bills have been introduced

20 Bills have become law

**State
Legislative
Proposals**

**15 Natural
Gas Utilities**

have begun developing
or have implemented
Voluntary Green Tariffs

**Voluntary
Programs**

**18 Natural
Gas Utilities**

are engaged in RNG
production projects

**Utility
Led RNG
Projects**

**Activity in 29 states to promote the use
of RNG in the residential or commercial
sector through either legislative,
regulatory, or utility led action.**

*this data does not include RNG interconnection activity

Thank you!

“With its low to negative life-cycle carbon footprint, RNG has great potential to continue driving down emissions and helping meet our nation’s environmental goals.”

- American Gas Foundation
2019 Renewable Sources of Natural Gas
Supply & Emission Reduction Assessment Study

Emily O’Connell
Director Energy Markets Policy
American Gas Association
eoconnell@aga.org

Renewable Natural Gas (RNG)

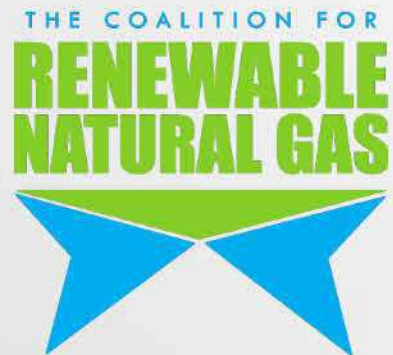
Arizona Corporation Commission

Johannes D. Escudero

Founder & CEO

Coalition for Renewable Natural Gas

May 18, 2021



RNG Presentation Overview

- Introduction: RNG Coalition, Mission, Position
- RNG 101: What is RNG, Where Does it Come From?
- RNG Benefits: Consumers, Farmers, Environment, Economy
- Industry Development History
- Current Market Size & Supply Availability
- Market Potential
- Contact Information

ORGANIZATION

- 501 (c) 6 Non-Profit
- RNG Industry Trade Association
- 15 Full-Time Staff, 11 Advisory Boards
- Federal, State & Provincial Policy Advocacy
- National & Regional Public Education
- Industry Best Practices
- Annual Industry Events



RNG COALITION

MEMBERSHIP

- 297 Member Companies
- Associations, Cities, Counties, Municipalities, Airports, Ports, Colleges & Universities
- Waste Collection, Waste Management & Recycling Companies, Renewable Energy Developers, Financiers, Engineering & Law Firms, Labor, Manufacturers, Technology & Service Providers, Gas/Power Marketers, Gas/Power Transporters, Fueling Stations, Fleets, Public & Investor-Owned Utilities, Retailers & Consumers.
- Producers of 98% of RNG Supply in North America

MISSION

We advocate and educate for sustainable development, deployment and utilization of renewable natural gas so that present and future generations will have access to domestic, renewable, clean fuel and energy.

POSITION

We support RNG produced from:

- all sustainable feedstocks
- all sustainable and competing technologies
- for all sustainable end-use applications

POLICY MENU

- General Support for RNG & RH2 (Obligated, Voluntary)
- Potential Studies and Policy Reports
- Procurement Authority & Programs
- Low Carbon Fuel & Renewable Portfolio Standards
- Customer Programs
- Interconnection Incentives
- Pilot Projects
- Carbon Free Designation
- Production Facility Grants
- Tax Incentives

WHAT IS RNG?

RNG is short for Renewable Natural Gas. It is methane, or raw biogas, that has been captured and conditioned so that it can be transported via existing pipeline infrastructure and substitute for conventional natural gas to fuel, heat and power vehicles, homes and businesses.

RNG is a clean, affordable and reliable energy option, available today that requires no upgrades or adjustments to existing appliances – including cooktops, furnaces or boilers.

WHERE DOES RNG COME FROM?

As organic waste materials decompose naturally, it emits methane – a greenhouse gas (GHG) many times more potent than carbon (CO₂).

RNG production facilities capture methane from food waste, animal manure, wastewater sludge, redirecting it away from the environment and removing harmful contaminants from the atmosphere.

RNG BENEFITS FOR CONSUMERS

A majority of consumers report that they are supportive of RNG, with almost a quarter interested in participating in a voluntary RNG program.

Consumers say they are more supportive of enabling energy choice rather than transitioning to electrification.

In a power outage, RNG can be tapped to provide reliable and sustainable energy, which is why it is already being used to support essential services for food storage, airports, universities, hospitals and other mission-critical facilities.

RNG BENEFITS FOR CONSUMERS

RNG supply from organic waste is comparable in price with other important decarbonization technologies.

Greenhouse emissions reductions from RNG often fall below regulated cost containment caps.

Most transportation fuel consumers will pay the same price for RNG as they do for compressed natural gas (CNG) or liquified natural gas (LNG), since environmental benefits of RNG are separately valued for compliance with state and federal regulatory programs.

RNG consumers can account for GHG reductions in their sustainability profile, which adds additional value from RNG beyond the simple commodity value.

RNG BENEFITS FOR FARMERS

RNG is sourced from various feedstocks, including crop residues and animal manure, making it a viable source of income and energy for U.S. farmers.

What has historically been a burden has now become a long-term financial asset. Some farms can create revenue streams, not only from efficiently handling their own farm waste but also from the sale of RNG to others.

RNG production through anaerobic digestion of materials yields valuable by-products like more effective fertilizer and even animal bedding. The direct-use or sale of these recycled materials can add an important revenue stream and/or savings to farms.

RNG BENEFITS FOR ENVIRONMENT

RNG helps reduce the impact organic waste has on the environment while fueling a greener future.

Solid waste is expected to grow nearly 70% by 2050 – RNG is the near-term solution to address this growing problem and convert the waste for clean, productive everyday use.

RNG sources from landfill diverted food and green waste can provide 125 percent carbon dioxide reduction, and RNG from dairy manure can result in a 400 percent carbon reduction when replacing traditional vehicle fuels.

RNG can be produced from methane that would otherwise escape into the atmosphere as a short-lived climate pollutant and greenhouse gas.

RNG BENEFITS FOR ENVIRONMENT

RNG is a complement to intermittent renewable electricity sources, like wind and solar, because it is storable and can be combined with other power generation resources.

To effectively address environmental challenges now, we need a diverse portfolio of solutions that can work together. RNG is an essential piece of the puzzle.

Because of its compatibility with our existing gas system, RNG is a big driver in reducing near-term greenhouse gas emissions.

Investments in RNG are investments in better waste management practices, including collection and digestion of inedible food waste and manure.

RNG BENEFITS FOR ECONOMY

RNG is an economic driver and job creator in communities across the country, bringing millions of dollars in capital investment to local economies.

RNG facilities support hundreds of thousands of clean energy-sector jobs in construction, operations, maintenance, manufacturing and engineering in some states. In fact, each new RNG production facility creates 5-7 times more jobs than an equivalently sized petroleum refinery and up to 172 direct and indirect jobs per project.

The RNG industry has experienced unprecedented growth in recent years, with over 150 operational RNG facilities and another 150 projects under construction or development in North America.

RNG BENEFITS FOR ECONOMY

Under a public-private partnership, an RNG production facility can increase revenue for communities when operational costs are shifted away from local governments.

Two-thirds of consumers say they would look favorably upon companies that integrate RNG into their operations.

While other green energy options often involve major, costly structural changes to homes and businesses, RNG offers consumers and businesses the ability to utilize current gas infrastructure for natural gas while shifting to a clean energy alternative.

RNG offers consumers and businesses choice and affordability.

DEVELOPMENT HISTORY

MARKET SIZE - RNG PROJECTS



RNG COALITION

2015 INITIATIVE

Through effective advocacy and education:

-Enable the RNG industry to double the number production facilities in operation from 47 to 100 by 2025.

RECENT GROWTH TRAJECTORY

MARKET SIZE - RNG PROJECTS



RNG COALITION

SMART INITIATIVE

Sustainable Methane Abatement & Recycling Timeline:

-Capture and control methane produced from the 43,000 aggregated organic waste sites in North America by 2050 achieving meaningful benchmarks by 2030 and 2040.

CURRENT STATE

MARKET SIZE - RNG PROJECTS



RNG SUPPLY AVAILABILITY

Sufficient RNG could be developed from organic waste feedstocks to cover 13% of current U.S. gas demand.

This could be used to supply *all* current commercial gas demand nationwide, or 75% of current residential demand, or 45% of industrial demand.

As of May 17, 2021, there are 157 operational RNG production facilities in North America, with an additional 150 RNG production facilities under construction or in substantial development.

MARKET POTENTIAL

MARKET SIZE - RNG PROJECTS



RNG COALITION

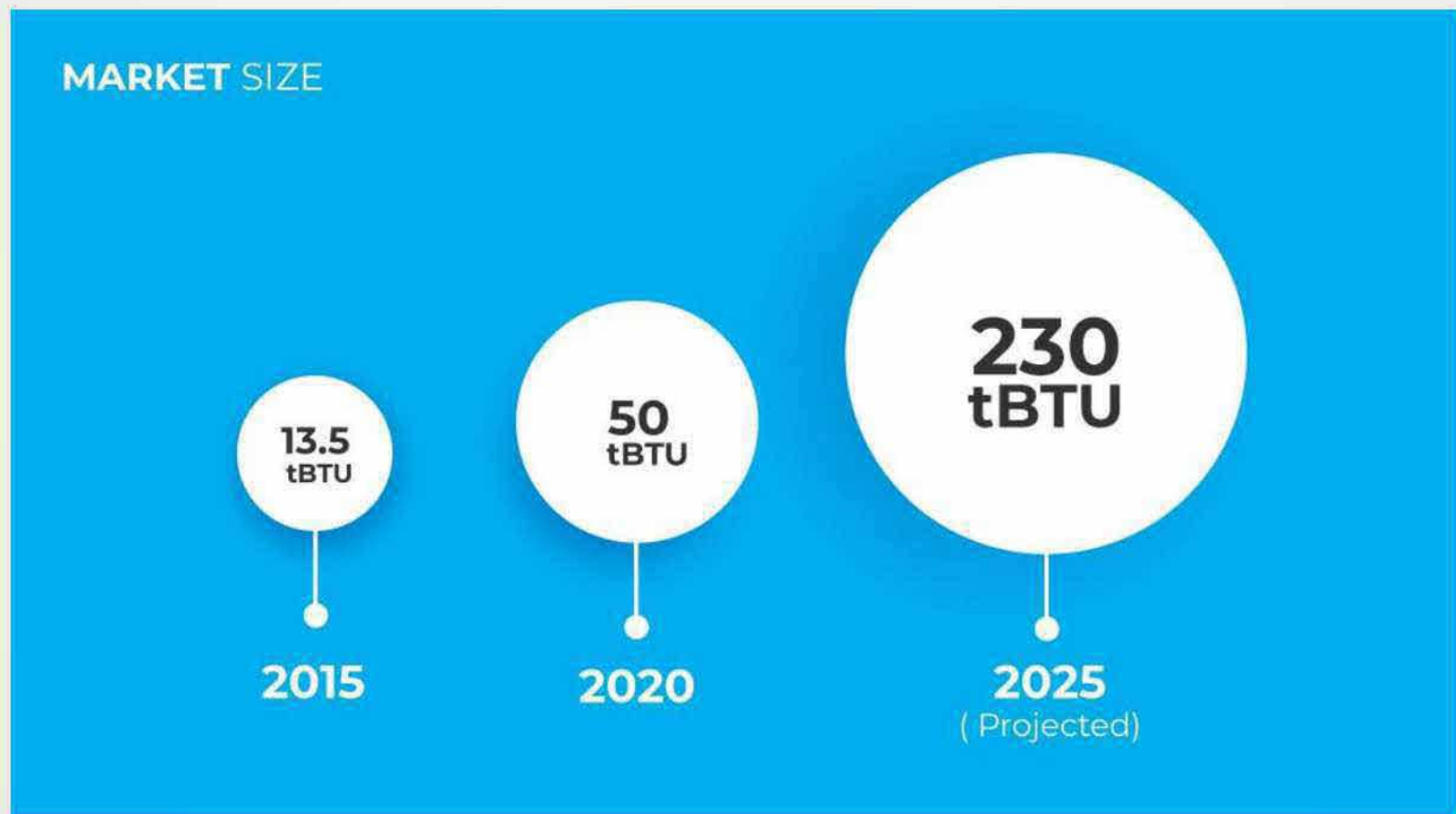
PROJECTED MARKET DEVELOPMENT

MARKET SIZE - RNG PROJECTS

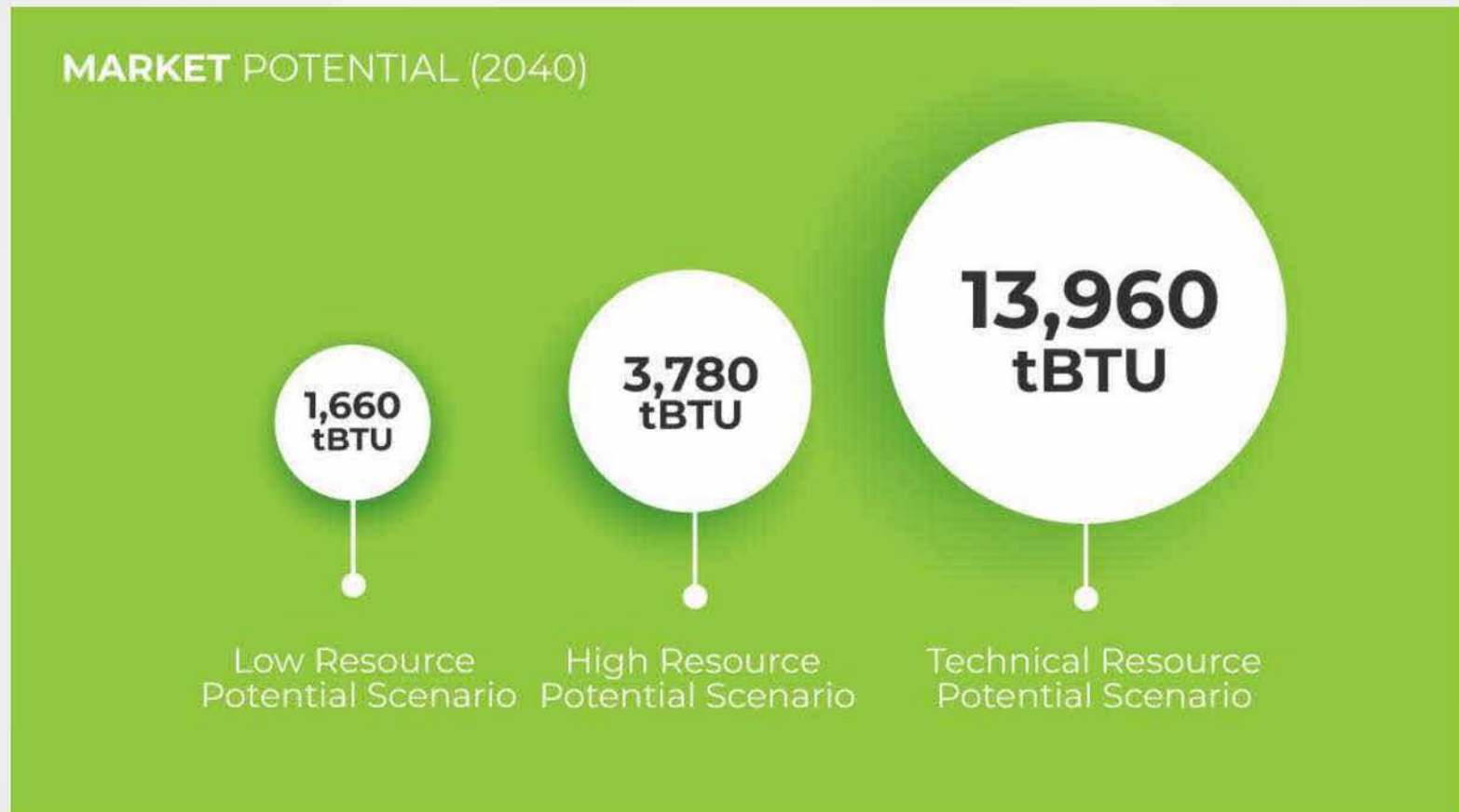


RNG COALITION

RECENT/NEAR-TERM (tBTU)

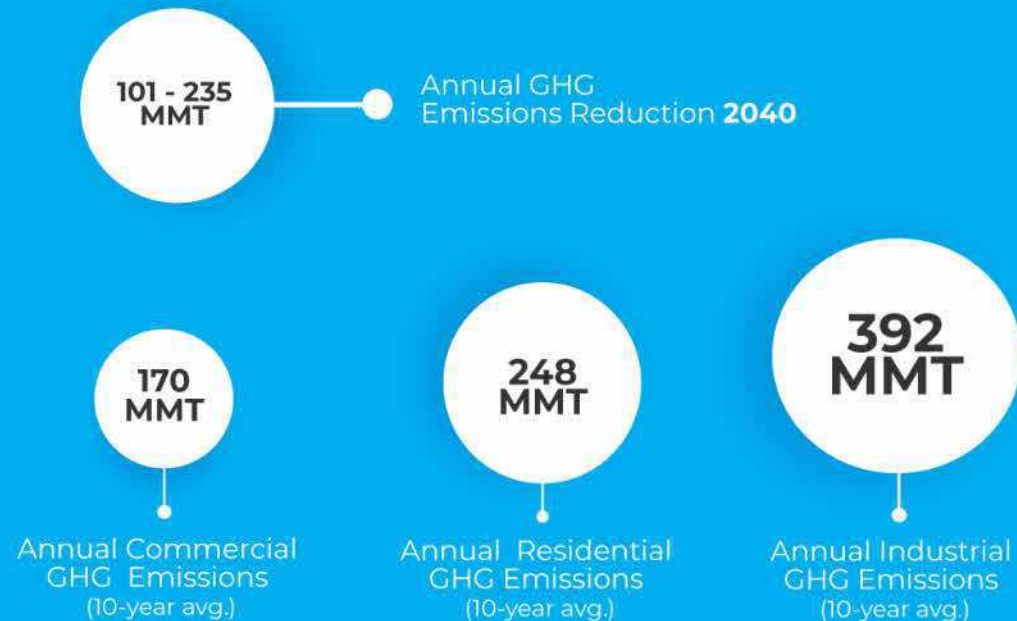


2040 POTENTIAL (tBTU)



2040 POTENTIAL (GHG Reductions)

MARKET POTENTIAL- ANNUAL GHG EMISSIONS



SPEAKER CONTACT INFO



Johannes D. Escudero

Founder & CEO

916.588.3033

916.520.4RNG (4764)

Johannes@RNGCoalition.com

RNGCoalition.com



91st Avenue Wastewater Treatment Plant

Renewable Natural Gas (RNG) Project

May 18, 2021

Agenda

- Ameresco Introduction
- 91st Ave WWTP RNG Project
 - Development Overview
 - Timeline
 - Challenges
- RNG Market
- Project Development Challenges
- Partner Benefits via P3
 - Financial
 - Environmental



91ST AVENUE WASTEWATER TREATMENT PLANT

About Ameresco

Ameresco, Inc. (NYSE:AMRC) is a leading cleantech integrator and renewable energy asset developer, owner and operator.

Founded in 2000 | Public in 2010



Comprehensive Portfolio

Objective approach and in-house technical expertise delivers the most advanced technologies to meet the unique needs of each customer. Majority of projects are budget-neutral, funded by energy cost savings.

Customer Driven

Federal & Municipal Governments, Commercial & Industrial, Higher Ed, K12, Public Housing, Healthcare, Airports. Market reputation across North America & Europe for excellence in customer satisfaction.



\$10+ Billion in energy solution projects, 280+ MWe of Owned Assets in Operation



8,000+ Customers benefitting from energy efficiency measures and renewable energy generation



1,000+ Employees throughout North America and the United Kingdom



Up to 45% Energy cost savings with comprehensive, audit-based improvements



70+ Offices providing local expertise in markets served



In 2020, our renewable energy assets and customer projects delivered a carbon offset equivalent to approx. **12.6M metric tons of CO₂**

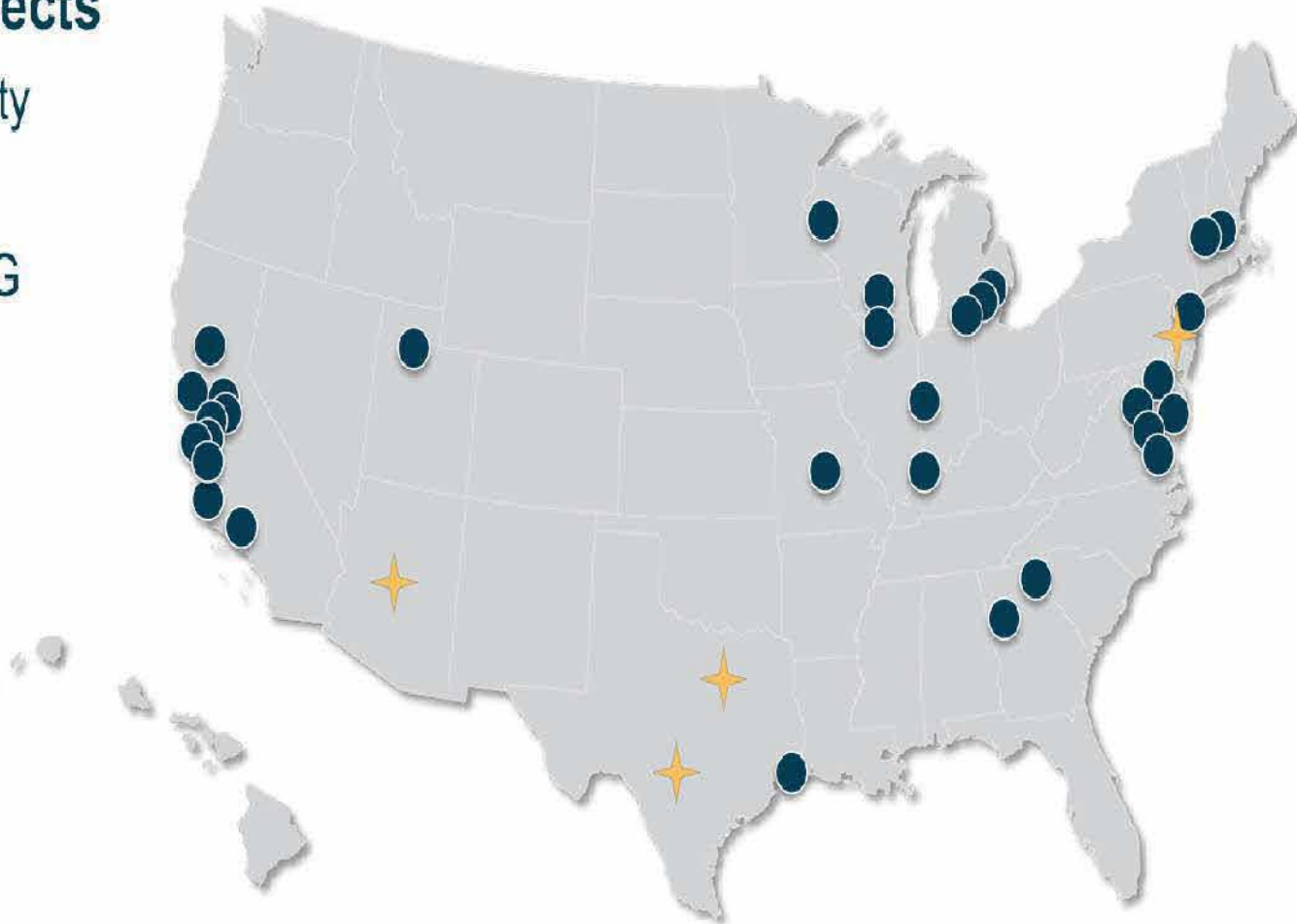
Ameresco's Biogas Portfolio

50 biogas projects

- LFG-to-Electricity
- Medium Btu
- High Btu or RNG

In Operations

- LFG Projects
- ★ WWTP Projects



The background of the slide is a black and white photograph of industrial equipment, likely from a wastewater treatment plant. It features various pipes, valves, and mechanical components. A large, horizontal pipe is prominent in the foreground on the right side. The image is partially obscured by a large orange graphic element on the left.

91st Avenue WWTP RNG Project

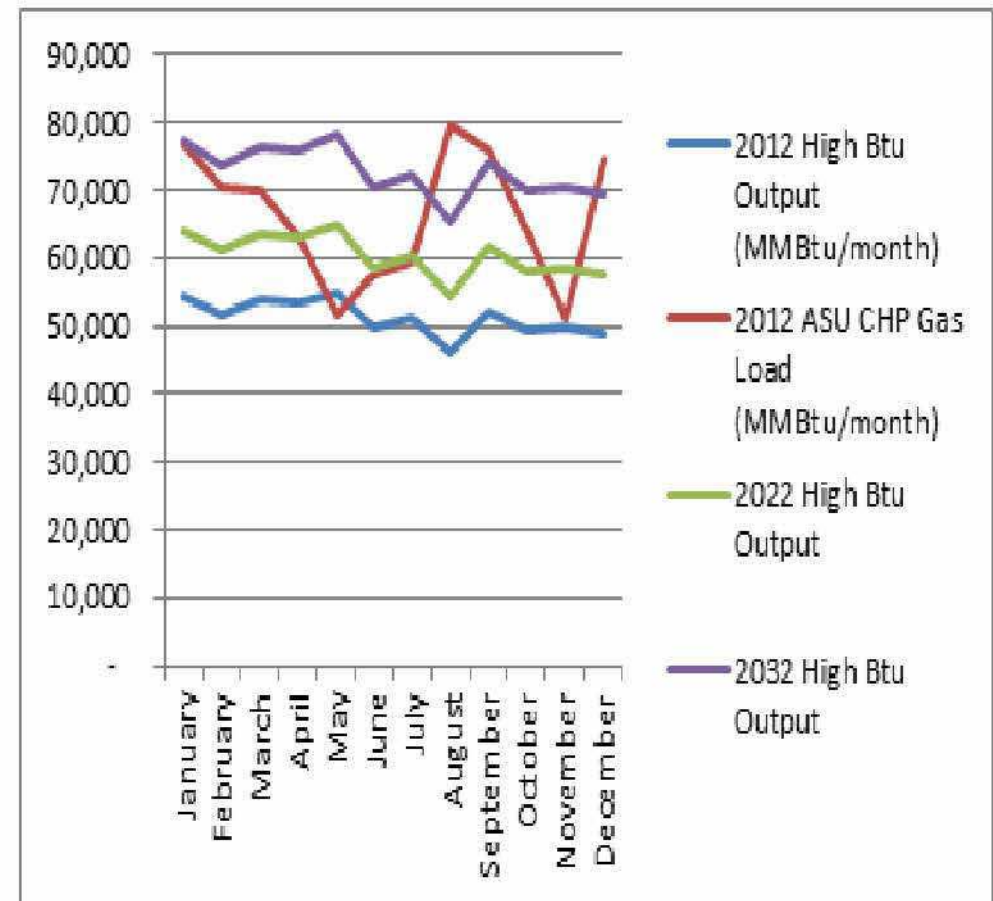
91st Ave Wastewater Treatment Plant

- One of the largest WWTP's in the US
- 200 million gallons per day
- Sub Regional Operating Group
 - Phoenix, Mesa, Tempe, Glendale & Scottsdale
- 600,000 mmBtu/year escalating at 1% per year
 - 21 commercial blimps/day
 - or 3,750 tanker trucks/day



Development Options

- On-site CHP
- Sale of electricity to grid
- MBtu sales to natural gas user
- RNG sales to natural gas market
- Public Private Partnership



Preferred Approach: Why RNG?

- Relatively low Arizona electrical rates
- Weak Arizona REC market
- Low Natural Gas prices
- Robust RIN Market
- Robust LCFS Market
- Environmentally Sound



Ownership Structures Contemplated

3rd Party Ownership

- Financing challenges

City/SROG Ownership

- SROG cities not interested
- Risk of merchant plant

Public Private Partnership Chosen

- Ameresco-ownership



The background of the slide is a black and white photograph of an industrial facility, likely a refinery or chemical plant. It features a complex network of pipes, valves, and large storage tanks. A prominent horizontal pipe runs across the middle of the frame. The entire image is partially covered by a large green triangular overlay on the left side, which contains the title text. A thin blue vertical line is positioned to the left of the text.

Development Timeline

Development Timeline

- 6/2012: SROG issues RFQ
- 9/2012: Ameresco submits best & final offer
- 11/2012: Ameresco notified of project award
- 4/2013: SROG selects preferred ownership approach
- 3/2014: Technical engineering due diligence begins
- 8/2014: Ameresco delivered final engineering due diligence report
- 6/2016: City of Phoenix and all SROG cities approve all project agreements
- 3/2017: Ameresco commences construction
- 4/2019: Commercial operations achieved

91st Ave Wastewater Treatment Plant

Groundbreaking – February 2, 2017



"Making Phoenix more sustainable isn't just the right thing to do, it is also sparks innovation and creates exciting new economic opportunities. By partnering with Ameresco at our new processing plant, Phoenix is taking previously untapped raw biogas generated by wastewater treatment and turning it into a renewable energy source that can be sold. This cutting-edge partnership benefits our regional economy and environment at the same time. Phoenix has set ambitious sustainability and renewable energy goals, and this partnership will help us get there."

Phoenix Mayor Greg Stanton
February 2, 2017

91st Ave Wastewater Treatment Plant

Ribbon Cutting – April 18, 2019



"This innovative partnership allows us to turn waste into resource by converting biogas, a byproduct of wastewater treatment, into renewable energy. This not only benefits our regional economy, but also reduces greenhouse gas emissions. Phoenix has set ambitious sustainability and renewable energy goals, and this kind of public-private partnership will help us get there."

Phoenix Mayor Kate Gallego
April 18, 2019

A black and white photograph of an industrial facility, likely a refinery or chemical plant, featuring complex piping, valves, and storage tanks. The image is partially obscured by a large blue diagonal overlay on the left side.

91st Ave RNG Project Challenges

Project Specific Challenges

- 5 SROG “Negotiators”, City Councils & Attorneys
- Pipeline Routing & Interconnection
 - Wetlands
 - ROW
 - Easements
- Maricopa County Air Permitting
- Palo Verde Plant Construction Window
- Evolving RNG Market
- Project Financing
- Construction
- Site Utilities & Facilities



City of Phoenix



mesa·az



Glendale
ARIZONA



Tempe



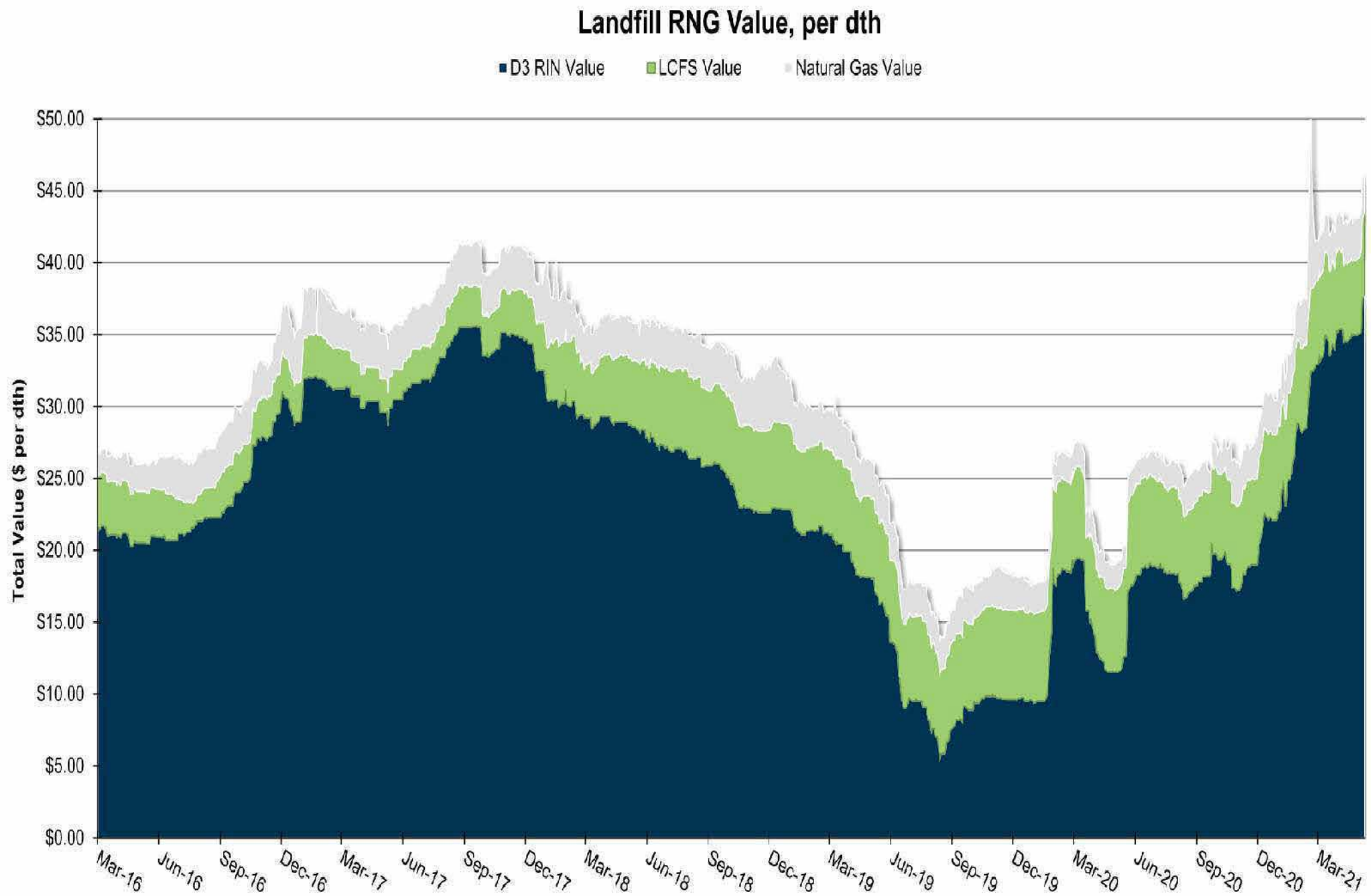
CITY OF
SCOTTSDALE



Renewable Natural Gas Market



Historic Value of RNG



The background of the slide is a black and white photograph of an industrial facility, likely a refinery or chemical plant. It features a complex network of pipes, valves, and large storage tanks. A prominent horizontal pipe runs across the middle of the frame. The scene is brightly lit, with shadows cast on the ground. A large, dark blue triangular graphic is overlaid on the left side of the image, pointing towards the right. A thin vertical yellow line is positioned to the left of the text.

Partner Benefits

Value & Benefits for SROG Members

- Utilization of Wasted Renewable Resource
- WWTP equipment O&M savings
- Royalty payments – tens millions of dollars over 20-term
- Cost savings (lower air permitting emissions)
- Positive PR
- Displacement of Fossil Fuels
- Meeting Sustainability Goals



Environmental Benefits

EPA calculates **44,671 metric tons of CO₂** saved per year & equivalent to:



87,425 acres of forests preserved for one year



43,662,920 gallons for gasoline consumed



70,452 passenger vehicles driven for one year



894,582 barrels of oil consumed



10,584 households heated for one year



2,009 railcars' worth of coal burned

<https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

Thank You



James Bier

Senior Project Developer

209.610.4318

jbier@ameresco.com

Daniel Hunter, MBA, CEM, FMP

Senior Account Executive

480.499.9155

dhunter@ameresco.com

2375 E. Camelback Road

Suite 400

Phoenix, AZ 85016